# 8058

# High-Mu Triode

## NUVISTOR TYPE

*For Cathode-Drive-Amplifier Applications at Frequencies Up to 1200 MHz and as an Oscillator Tube having Excellent Stability Over a Wide Range of Frequencies*

## ELECTRICAL CHARACTERISTICS

Bogey Values

| | | | |
|---|---|---|---|
| **Heater Voltage, AC or DC** | $E_h$ | 6.3 | V |
| **Heater Current at $E_h$ = 6.3 V** | $I_h$ | 135 | mA |
| **Direct Interelectrode Capacitances** | | | |
| Input: K to (G, S, H) | $c_i$ | 6.0 | pF |
| Output: P to (G, S, H) | $c_o$ | 1.3 | pF |
| Cathode to plate | $c_{kp}$ | 0.046 max | pF |
| Heater to cathode | $c_{hk}$ | 1.4 | pF |

## CLASS A$_1$ AMPLIFIER

*For Following Characteristics see* Conditions

| | | | |
|---|---|---|---|
| **Amplification Factor** | $\mu$ | 70 | |
| **Plate Resistance (Approx.)** | $r_p$ | 5600 | Ω |
| **Transconductance** | $g_m$ | 12400 | µmho |
| **DC Plate Current** | $I_b$ | 10 | mA |
| **Cutoff DC Grid Voltage for $I_b$ = 10 µA** | $E_{c(co)}$ | -5 | V |

Conditions

| | | | |
|---|---|---|---|
| **Heater Voltage** | $E_h$ | 6.3 | V |
| **Plate Supply Voltage** | $E_{bb}$ | 110 | V |
| **Grid Supply Voltage** | $E_{cc}$ | 0 | V |
| **Cathode Resistor** | $R_k$ | 47 | Ω |

## ABSOLUTE-MAXIMUM RATINGS

*For operation at any altitude*

| | | | |
|---|---|---|---|
| **Plate Supply Voltage** | $E_{bb}$ | 330 | V |
| **DC Plate Voltage** | $E_b$ | 150 | V |
| **Grid Voltage** | | | |
| DC positive value | $E_c$ | 0 | V |
| DC negative value | $E_c$ | -55 | V |
| **Peak Heater-Cathode Voltage** | $e_{hkm}$ | ±100 | V |
| **Heater Voltage, AC or DC** | $E_h$ | 5.7 to 6.9 | |
| **Average Cathode Current** | $I_{k(av)}$ | 15 | mA |
| **Plate Dissipation** | $P_b$ | 1.5 | W |

## MAXIMUM CIRCUIT VALUES

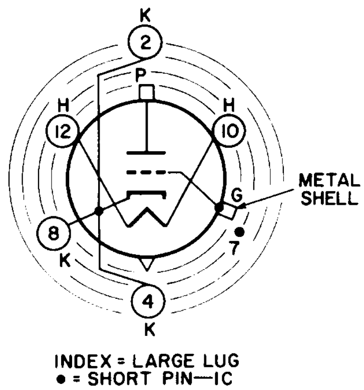
| | | | |
|---|---|---|---|
| **Grid-Circuit Resistance**[a] | | | |
| For fixed-bias operation | $R_{g(ckt)}$ | 0.5 | MΩ |
| For cathode-bias operation | $R_{g(ckt)}$ | 1 | MΩ |

## MECHANICAL CHARACTERISTICS

| | |
|---|---|
| Operating Position | Any |
| Type of Cathode | Coated Unipotential |
| Maximum Overall Length ($l_m$) | 0.985 in |
| Maximum Seated Length ($l_{sm}$) | 0.780 in |
| Maximum Diameter ($d_m$) | 0.440 in |
| Weight (Approx.) | 2.2 g |
| Dimensional Outline | JEDEC No.4-6 |
| Envelope | JEDEC MT4 |
| Base | Medium-Ceramic-Wafer Twelvar 5-Pin (JEDEC E5-79) |

→ BASING DIAGRAM (Bottom View)

Pin 2 – Cathode
Pin 4 – Cathode
Pin 7[b] – Do Not Use
Pin 8 – Cathode
Pin 10 – Heater
Pin 12 – Heater
Metal Shell – Grid
Top Cap – Plate




12CT

## TYPICAL OPERATION

*As Cathode-Drive RF Amplifier*

| | | | | | |
|---|---|---|---|---|---|
| Frequency | f | 450 | 700 | 1200 | MHz |
| Heater Voltage | $E_h$ | 6.3 | 6.3 | 6.3 | V |
| Plate Supply Voltage | $E_{bb}$ | 110 | 110 | 110 | V |
| Cathode Resistor | $R_k$ | 47 | 47 | 47 | Ω |
| Average Plate Current | $I_{b(av)}$ | 10 | 10 | 10 | mA |
| Bandwidth | - | 6 | 12 | 12 | MHz |
| Power Gain | - | 16.5 | 12.5 | 10.5 | dB |
| Noise Factor[c] | NF | 6.5 | 9.5 | 12.2 | dB |

→ [a] For operation at metal-shell temperature of 150 °C. For operation at other metal-shell temperatures, see *Grid-Circuit Resistance Chart*. Metal-shell temperature are measured in zone "A" (See *Dimensional Outline*).

[b] Pin 7 is of such a length such that its end does not touch the socket insertion plane.

[c] Argon noise source. Input is tuned for optimum value.

→ Indicates a change.



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## INITIAL CHARACTERISTICS LIMITS

| | | Note | Min | Max | |
|---|---|---|---|---|---|
| Heater Current . . . . . . . | $I_h$ | 1 | 0.125 | 0.145 | A |
| Direct Interelectrode Capacitances | | | | | |
| Cathode to plate . . . . . | $c_{kp}$ | 2 | - | 0.046 | pF |
| Cathode to grid & shell and heater. . . . . . . | $c_i$ | 2 | 5 | 7 | pF |
| Plate to grid & shell and heater. . . . . . . | $c_o$ | 2 | 1.1 | 1.5 | pF |
| Heater to cathode. . . . . | $c_{hk}$ | 2 | 1.1 | 1.7 | pF |
| Plate Current (1). . . . . . | 1 $I_b$ | 1,3 | 7.8 | 13.2 | mA |
| Plate Current (2). . . . . . | 2 $I_b$ | 1,4 | - | 50 | μA |
| Transconductance (1) . . . . | 1 $g_m$ | 1,3 | 10000 | 14800 | μmho |
| Transconductance (2) . . . . | 2 $g_m$ | 3,5 | 8700 | - | μmho |
| Reverse Grid Current . . . . | $-I_c$ | 1,6 | - | 0.1 | μA |
| Amplification Factor . . . . | $\mu$ | 1,3 | 54 | 86 | |
| Heater-Cathode Leakage Current . . . . . . . . . . | $I_{hk}$ | 1,7 | - | ±5 | μA |
| Leakage Resistance: | | | | | |
| Between grid and all other electrodes tied together. | $r_g$-all | 1,8 | 5000 | - | MΩ |
| Between plate and all other electrodes tied together. | $r_p$-all | 1,9 | 10000 | - | MΩ |

**Note 1:** With $E_f$ = 6.3 V.

**Note 2:** Measured without external shield in accordance with the current issue of EIA Standard RS-191.

**Note 3:** With $E_{bb}$ = 110 V, $R_k$ = 47 Ω, $C_k$ = 1000 μF.

**Note 4:** With $E_b$ = 110 V, $E_c$ = -5 V.

**Note 5:** With $E_f$ = 5.7 V.

**Note 6:** With $E_b$ = 150 V, $E_c$ = -1.3 V, $R_g$ = 0.5 MΩ.

**Note 7:** With $E_{hk}$ = ±100 V.

**Note 8:** With $E_g$-all = -100 V.

**Note 9:** With $E_p$-all = -300 V.

## SPECIAL RATINGS & PERFORMANCE DATA

### Shock Rating

Impact Acceleration. . . . . . . . . . . . . . . . 1000 max g ←

This test is performed on a sample lot of tubes to determine ability of tube to withstand the specified impact acceleration. Tubes are held rigid in four different positions in a Navy Type, High-impact (flyweight) Shock Machine and are subjected to 20 blows at the specified maximum impact acceleration. At the end of this test, tubes are criticized for change in transconductance, reverse grid current, and heater-cathode leakage current, and are then subjected to the Variable-Frequency Vibration Test described below.

← Indicates a change.

## Variable-Frequency Vibration Performance

This test is performed on a sample lot of tubes from each production run. The tube is operated under the conditions specified in CHARACTERISTICS RANGE VALUES for Transconductance (1) with the addition of a plate-load resistor of 2000 ohms. During operation, tube is vibrated in a direction perpendicular to the logitudinal axis of the tube through the frequency range from 50 to 15,000 c/s per second under the following conditions: a sweep rate of one octave per 30 seconds from 50 to 3000 c/s, a 7-second sweep from 3000 to 15,000 c/s, and a constant vibrational acceleration of 1 g. During the test, tube must not show an output voltage in excess of: (1) 35 millivolts rms from 50 to 3000 c/s, (2) 80 millivolts peak from 3000 to 6000 c/s, and (3) 700 millivolts peak from 6000 to 15,000 c/s.

## Low-Pressure Voltage-Breakdown Test

This test is performed on a sample lot of tubes. In this test, tubes are operated with 250 volts rms applied between plate and all other electrodes and will not break down or show evidence of corona when subjected to air pressures equivalent to altitudes of up to 100,000 feet.

## Heater Cycling

**Cycles of Intermittent Operation . . . . . . 2000 min cycles**

This test is performed on a sample lot of tubes from each production run under the following conditions: heater volts = 7.5 cycled one minute on and two minutes off; heater 100 volts negative with respect to cathode; grid & metal shell and plate connected to ground. At the end of this test, tubes are tested for open heaters, heater-cathode shorts, and heater-cathode leakage current.

## Shorts and Continuity

This test is performed on a sample lot of tubes from each production run. Tubes are subjected to the Thyratron-Type Shorts Test described in MIL-E-ID, Amendment 2, Paragraph 4.7.7, except that tapping is done by hand with a soft rubber tapper[d]. See accompanying Shorts-Test Acceptance-Limits curve. Tubes are criticized for permanent or temporary shorts and open circuits.

## 1000-Hour Conduction Life Performance

This test is performed on a sample lot of tubes from each production run to insure high quality of the individual tube and guard against epidemic failures due to excessive changes in any of the characteristics indicated below. In this test, tubes are operated for 1000 hours at maximum-rated plate dissipation and with a metal-shell temperature of 150 °C; then criticized for inoperatives, reverse grid current, heater-cathode leakage current, and leakage resistance. In addition, the average change in transconductance of the lot from the 0-hour value for Transconductance (1) specified in CHARACTERISTICS RANGE VALUES, must not exceed 15 per cent of 500 hours, and 20 per cent at 1000 hours.

## Interelectrode Leakage

Leakage Resistance between plate and all other electrodes tied together . . . 10000 min megohms

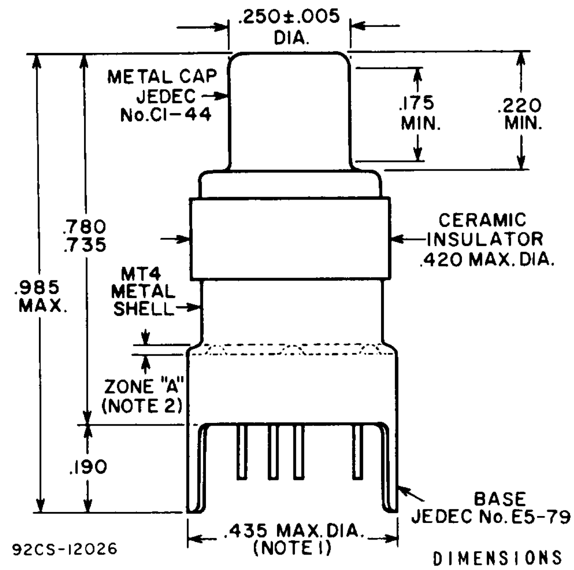
This test is performed on a sample lot of tubes from each production run under the following conditions: heater volts (ac or dc) = 6.3, plate volts = 300 negative with respect to all other electrodes tied together.

Leakage Resistance between grid and all other electrodes tied together . . . 5000 min megohms

This test is performed on a sample lot of tubes from each production run under the following conditions: heater volts (ac or dc) = 6.3, grid volts = 100 negative with respect to all other electrodes tied together.

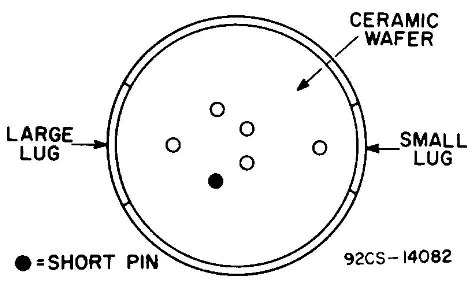
[d] Specification for tapper will be supplied on request.

DIMENSIONAL OUTLINE
JEDEC No. 4-6

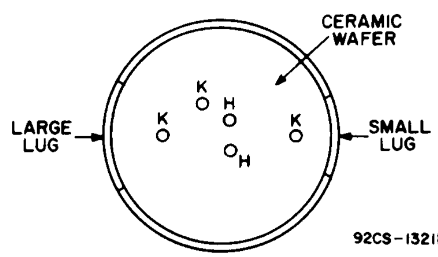



DIMENSIONS IN INCHES

BOTTOM VIEW
Showing Arrangement of All 6 Base Pins




MODIFIED BOTTOM VIEW
With Element Connections Indicated and Short Pin Not Shown




DIMENSIONS IN INCHES

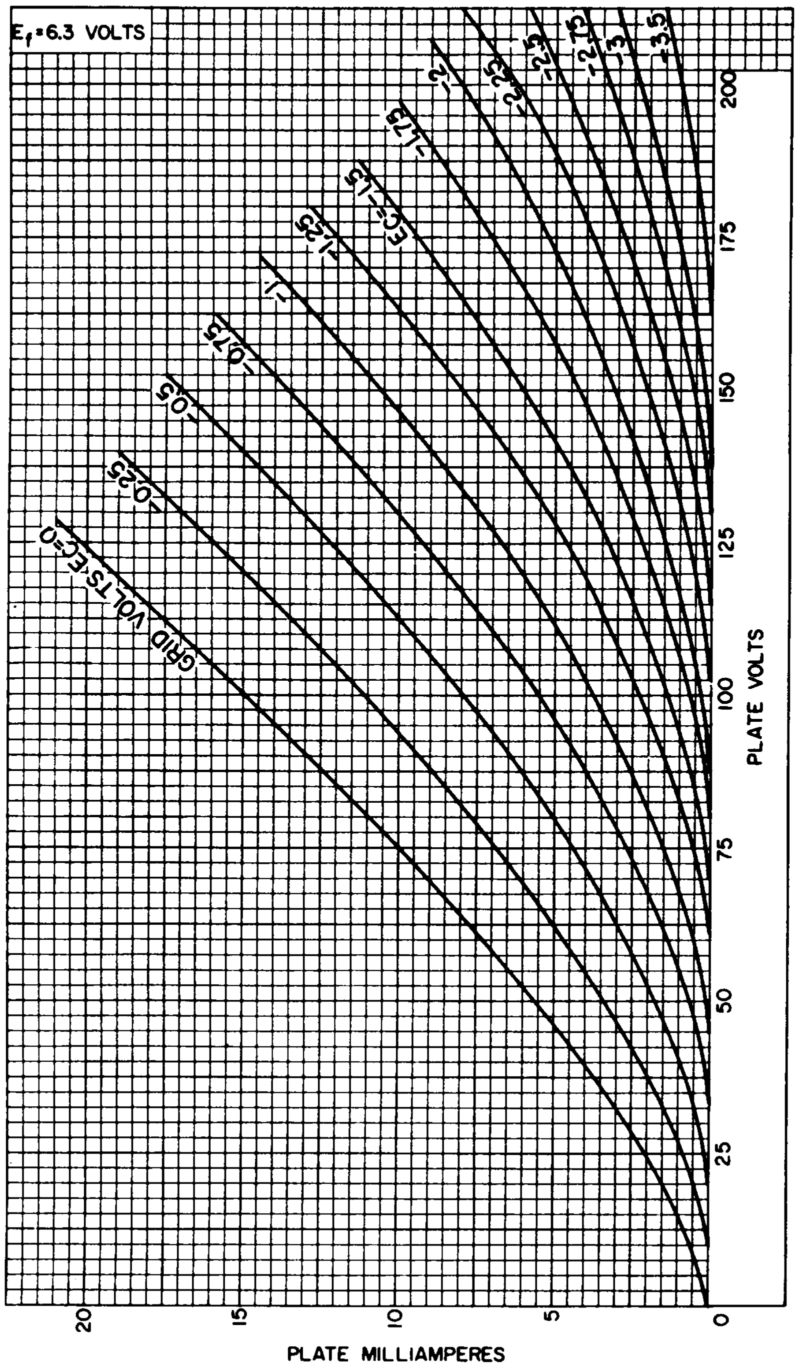
**Note 1:** Maximum outside diameter of 0.440 inch is permitted along 0.190" lug length.

**Note 2:** Metal-shell temperature should be measured in zone "A".



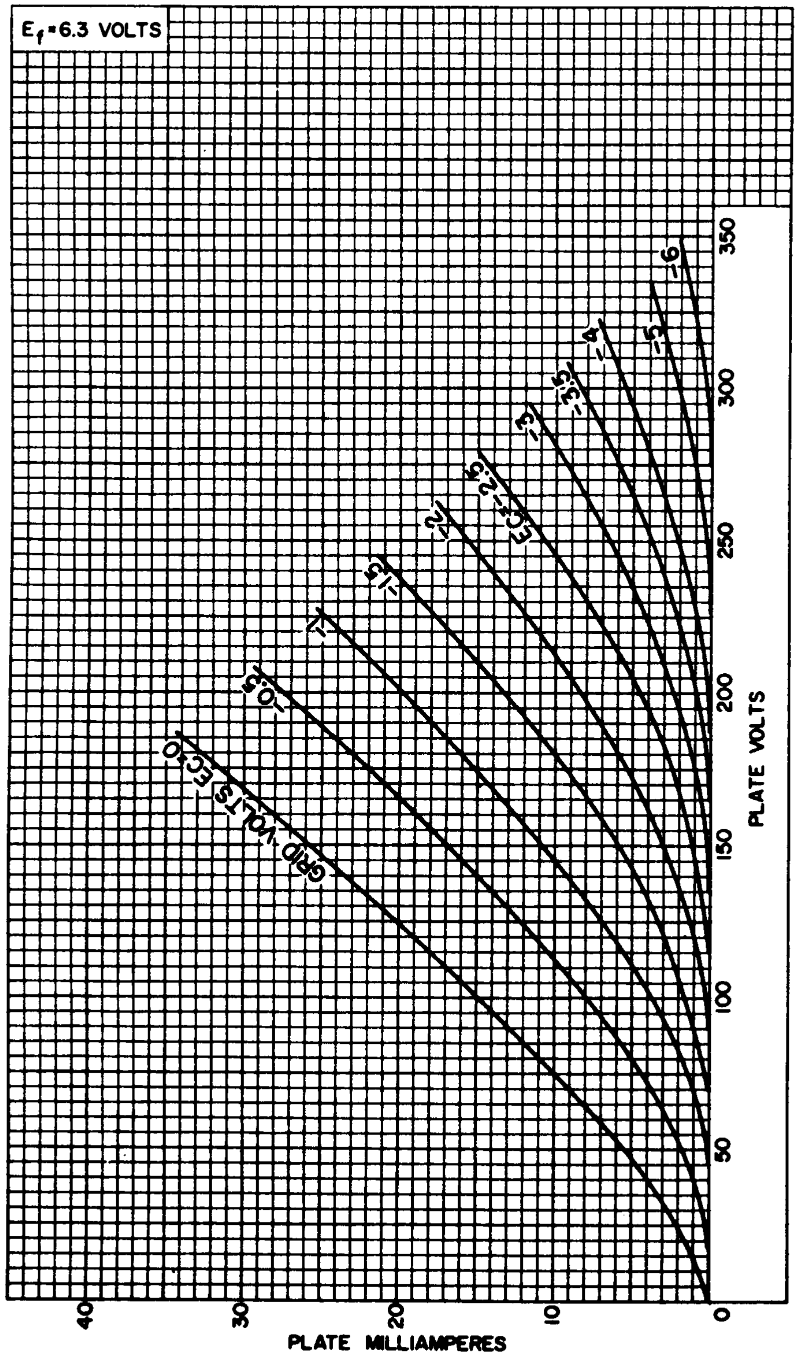
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## Average Plate Characteristics




92CM-11426R1

## Average Plate Characteristics

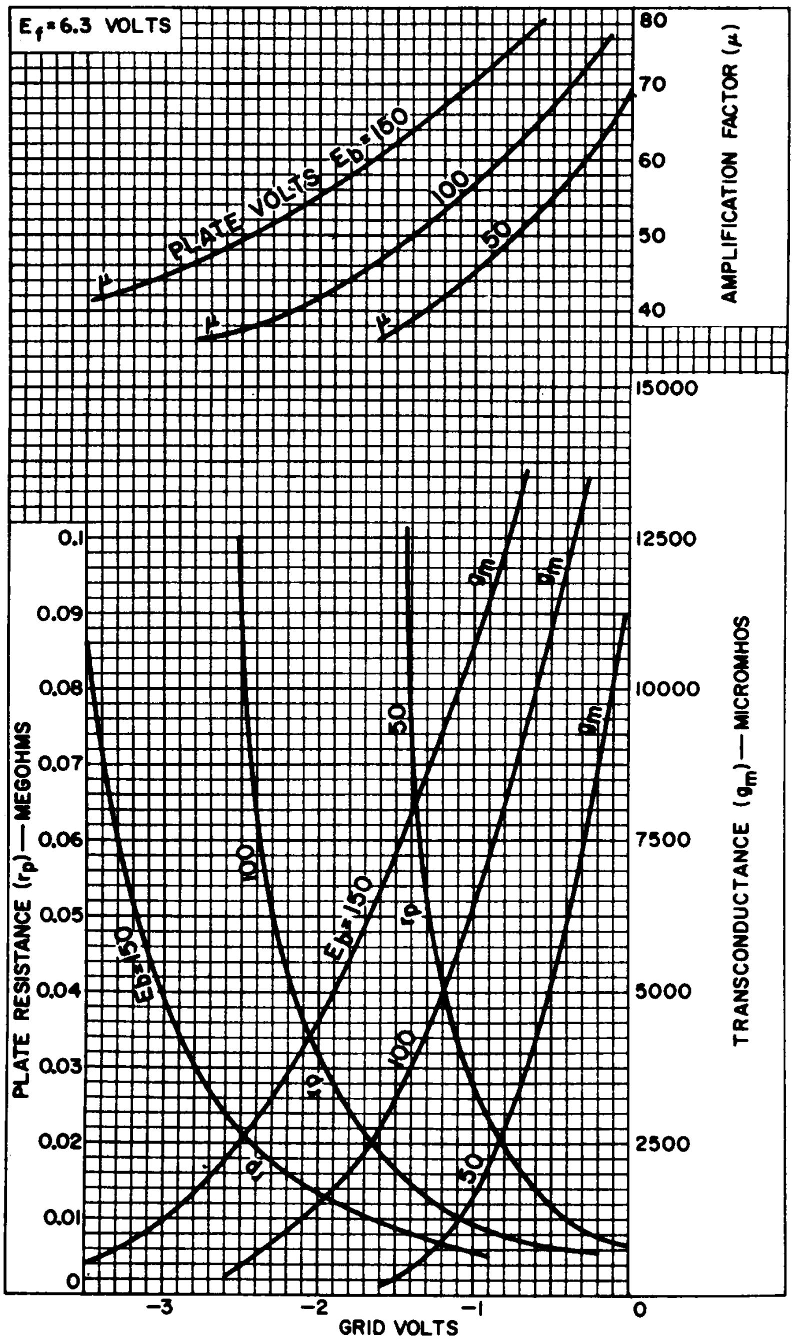



92CM-11430R1



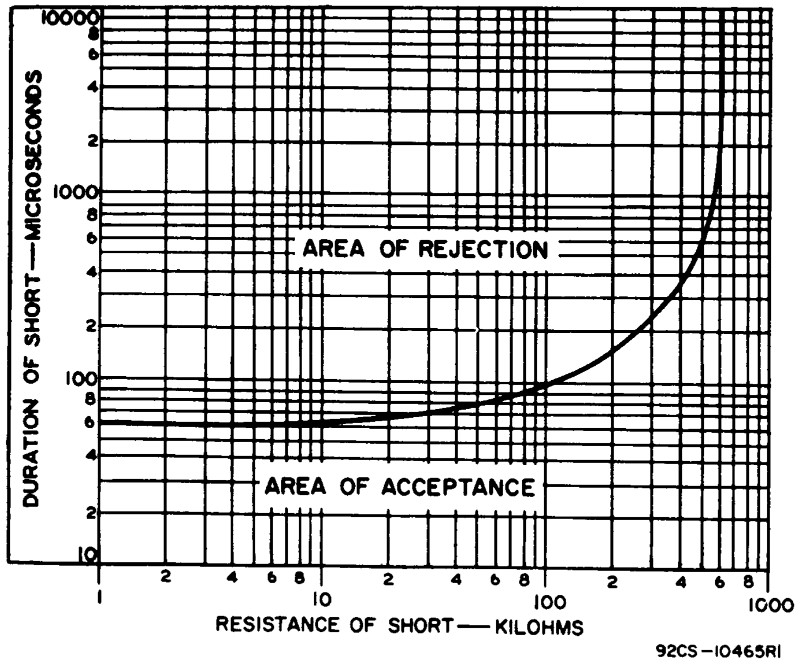
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## Average Characteristics

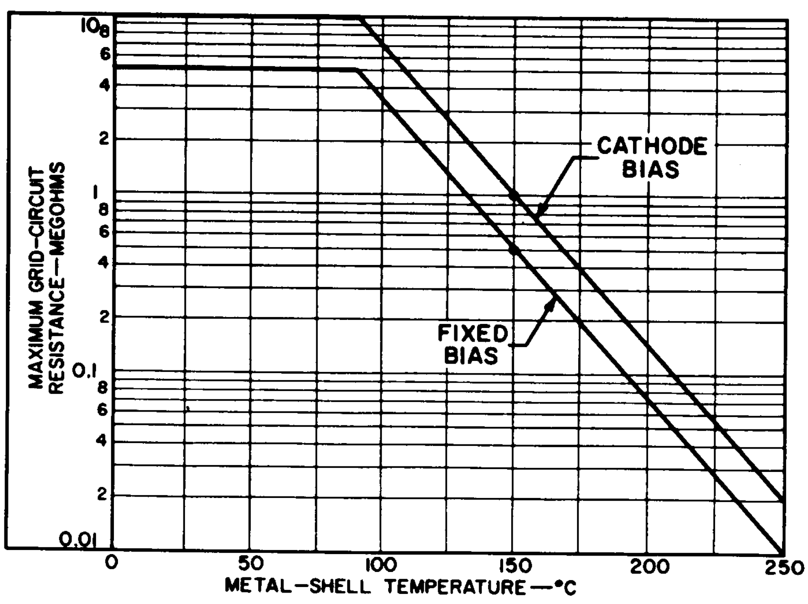



92CM-11410

## Shorts-Test Acceptance Limits




## Grid-Circuit-Resistance Chart






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